C. Comparison of technology based effluent limits and water quality based effluent limits

The following table compares the technology based effluent limits with the water quality based effluent limits. The proposed effluent limits in the draft permit are the more stringent of the two types of limits.

Parameter	**Technology Based Effluent Limits**				**Water Quality Based Effluent Limits**					**Proposed Effluent Limits in Draft Permit**			
	AML	AWL	IML	range	AML	AWL	DML	IML	range	AML	AWL	DML	IML
BOD_5	45 mg/L	65 mg/L	---	---	---	---	---	---	---	45 mg/L	65 mg/L	---	---
	77 lbs/day	116 lbs/day			---	---	---			77 lbs/day	116 lbs/day	---	
BOD_5, Percent Removal	65	---	---	---	---	---	---	---	---	65	---	---	---
TSS	70 mg/L	105 mg/L	---	---	---	---	---	---	---	70 mg/L	105 mg/L	---	---
	160 lbs/day	240 lbs/day			---	—	---			160 lbs/day	240 lbs/day	---	
TSS, Percent Removal	65	—	—	—	—	—	—	—	—	65	—	—	—
Fecal Coliform Bacteria	---	200/100 ml	---	---	---	---	---	---	---	---	200/100 ml	---	---
E.Coli Bacteria	---	---	---	---	126/100 ml	---	---	576/100 ml	—	126/100 ml	---	---	576/
Residual Chlorine	500 µg/L	750 µg/L			12.2 µg/l	---	18.0 µg/L			12.2 µg/l	---	18.0 µg/L	---
					0.1 lbs/day		0.2 lbs/day			0.1 lbs/day		0.2 lbs/day	
pH				6.0-9.0					6.5-9.5	---	---		---

AML means Average Monthly Limit
AWL means Average Weekly Limit
DML means Daily Maximum Limit
IML means Instantaneous Maximum Limit
--- means no limit

APPENDIX D
Derivation of Water Quality Based
Effluent Limitations for Total Residual Chlorine

The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality based requirements, the permit limits are based on maintaining the effluent quality at a level that will comply with the water quality standards, even during critical conditions in the receiving water (i.e., low flows). These requirements are determined by the wasteload allocation (WLA). The WLA dictates the required effluent quality which, in turn, defines the desired level of treatment plant performance or target long-term average (LTA).

To support the implementation of EPA's national policy for controlling the discharge of toxicants, EPA developed the "*Technical Support Document for Water Quality-Based Toxics Control*" (EPA/505/2-90-001, March 1991, TSD). The following is a summary of the procedures recommended in the TSD in deriving water quality-based effluent limitations for toxicants. This procedure translates wasteload allocations for total residual chlorine to "end of the pipe" effluent limits.

Calculation of Total Residual Chlorine Limits

Step 1 - Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$(Q_e + Q_u)\, C_d = Q_e C_e + Q_u C_u$$

where,

C_d = aquatic life criteria that cannot be exceeded downstream
C_d (acute) = 19.0 µg/l; C_d (chronic) = 11.0 µg/l
Q_e = effluent flow = Peak average monthly flow of 1.46 mgd
C_e = allowable concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream low flow = 0
C_u = upstream background concentration of pollutant = 0 µg/l

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{(Q_u + Q_e)\, C_d - Q_u C_u}{Q_e}$$

Therefore,

$WLA_{acute} = \frac{(19.0 \text{ X } 0) + (19.0 \text{ X } 1.46)}{1.46} = 19 \text{ µg/l}$

$WLA_{chronic} = \frac{(11.0 \text{ X } 0) + (11.0 \text{ X } 1.46)}{1.46} = 11 \text{ µg/l}$

Step 2 - Determine the Long Term Average (LTA)

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$
where,
σ^2 = $\ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation/mean = 0.6 (default value is used because there are no effluent data for chlorine).

$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$

where,
σ^2 = $\ln[(CV^2/n) + 1]$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.6
n = number of sampling events required per month = 20

Calculate the LTA_{acute} and the $LTA_{chronic}$:

LTA_{acute} = 19 X 0.321 = 6.1 µg/L
$LTA_{chronic}$ = 11 X 0.528 = 5.8 µg/L

Step 3

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

Step 4

1. The MDL and the AML would be calculated as follows:

$MDL = LTA_{chronic} \times e^{[z\sigma - 0.5\sigma^2]}$

where,

σ^2	$= \ln(CV^2 + 1)$
z	= 2.326 for 99th percentile probability basis
CV	= coefficient of variation
$LTA_{chronic}$	= 5.8 µg/L
$e^{[z\sigma - 0.5\sigma^2]}$	= 3.1115
MDL	= 18.0 µg/L

Federal regulations require limits to be expressed as mass. The mass based limit is:
(18.0 ÷ 1000) X 8.34 X 1.46 = 0.2 lbs/day

$AML = LTA_{chronic} \times e^{[z\sigma - 0.5\sigma^2]}$

where,

σ^2	$= \ln[(CV^2/n) + 1]$
z	= 1.645 for 95th percentile probability basis
CV	= coefficient of variation
n	= number of sampling events required per month = 20
$LTA_{chronic}$	= 5.8 µg/L
$e^{[z\sigma - 0.5\sigma^2]}$	= 2.134
AML	= 12.2 µg/L

The mass based limit is:
(12.2 ÷ 1000) X 8.34 X 1.46 = 0.1 lbs/day

The effluent limitations for chlorine are not quantifiable using EPA approved analytical methods. EPA will use 100 µg/L (the Minimum Level) as the compliance evaluation level for this parameter.

APPENDIX E
Endangered Species Act

I. Map of the Lower Clearwater River Watershed (and facility locations)

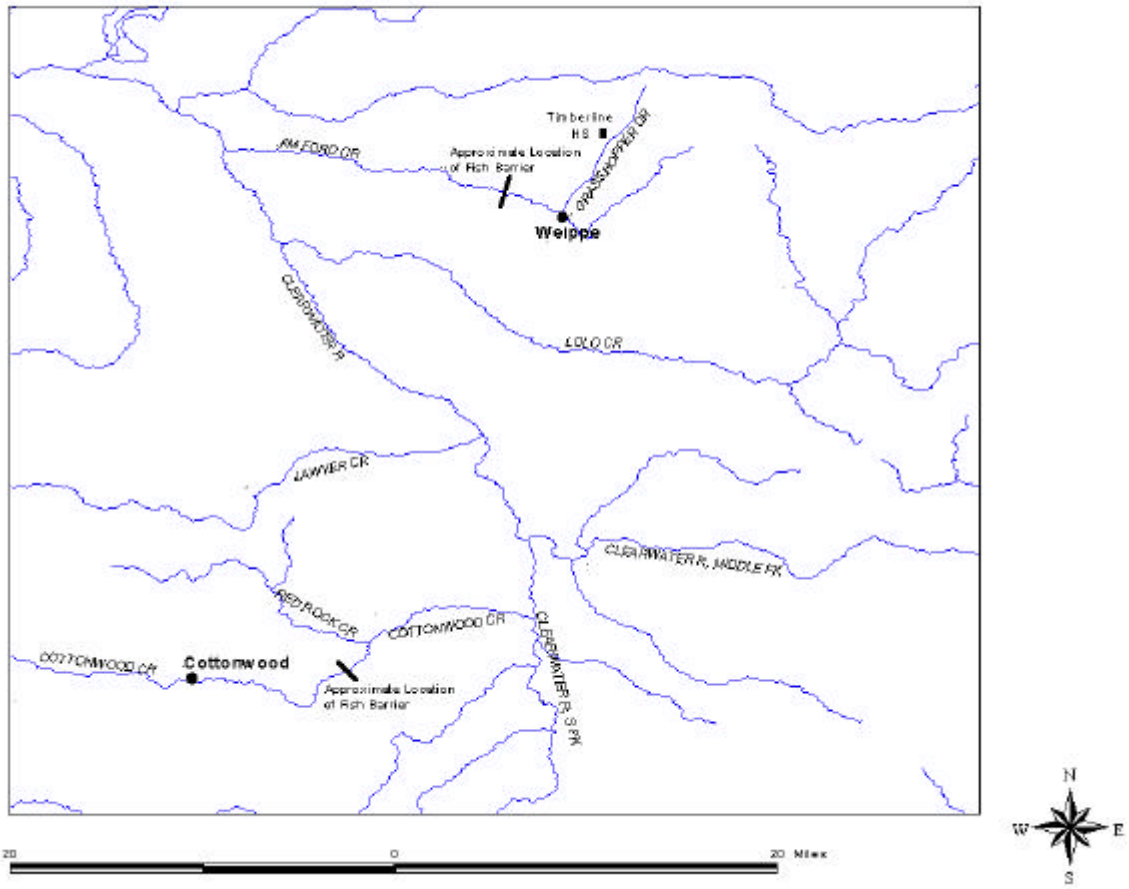

Figure 1. Map of Jim Ford Creek and Cottonwood Creek Watersheds

II. Endangered/Threatened/Proposed/Candidate Species List

(A) Background: In a letters dated November 21, 2000 EPA requested species lists from the U.S. Fish and Wildlife Service (USF&WS) and the National Marine Fisheries Service (NMFS) for the following facilities:

City of Cottonwood
City of Weippe
Joint School District #171 (Timberline High School)

In response to that request USF&WL provided EPA with a County Species List (#1-4-00-sp-658), and a document entitled *Threatened, Endangered, Candidate, and Species of Concern Biological Information and Guidance* (USF&WL, July 1999). On June 1, 2001, the USF&WLS provided a new reference number (1-4-01-SP-827) and an updated species list through March 1, 2001. There were no additions or changes to the previous list. USF&WL asked EPA to formulate a list of species based on these documents.

EPA developed an endangered/threatened species list based on the County List, the document: *Threatened, Endangered, Candidate, and Species of Concern Biological Information and Guidance*.

City of Weippe: The City of Weippe owns and operates a facility which treats domestic sewage from local residents and commercial establishments. There are no significant industrial dischargers to the system. The facility has a design flow of 0.536 million gallons per day (mgd). Because of the minimum instream dilution requirement provided by the existing permit, the facility can typically only discharge during January through June each year. During 1999 (January through April) and 2000 (February through April), the average daily flow rates were 0.370 mgd and 0.424 mgd. The facility provides biological treatment in three aerated lagoons, as well as disinfection by chlorination prior to discharging effluent to Jim Ford Creek.

During Summer 1991, the city enlarged the holding capacity of the lagoons. The enlargement of the first lagoon apparently thinned the clay seal and caused a leak. An underdrain was installed to provide drainage which now discharges at a low rate (<0.01 cubic feet per second or cfs) to Grasshopper Creek year around. Grasshopper Creek flows into Jim Ford Creek immediately upstream of Outfall 001. The underdrain has been identified as a source of fecal coliform loadings to Grasshopper Creek The draft permit includes a requirement that the underdrain discharge be eliminated within two years of the effective date of the permit.

Timberline High School*:* Sewage from the Timberline High School is treated in a series of two lagoons. The first lagoon is cement lined and provides mechanical aeration. The second lagoon discharges via Outfall 001 to Grasshopper Creek approximately six miles upstream of the confluence with Jim Ford Creek. Discharge from the system generally occurs during the school year from September through June; however, some discharges have been reported throughout the year. The average flow rate is 0.002 mgd and the maximum flow during the past year was 0.004 mgd.

City of Cottonwood: The City of Cottonwood owns and operates a facility which treats domestic sewage from local residents and commercial establishments. Sewage is initially treated in aeration lagoons (3 primary and a series of 2 secondary lagoons). The three primary lagoons and the first secondary lagoon are lined with bentonite along the side adjacent to Cottonwood Creek. From the fifth lagoon, water is pumped to chlorination. Approximately 50 percent of the flow subsequently undergoes dechlorination. As required by the existing NPDES permit, the facility is not allowed to discharge effluent to the creek from April through October. From May through October, the city land applies treated wastewater to approximately 40 acres of poplar trees. Land application is performed under

a permit issued by the Idaho Department of Environmental Quality (IDEQ). A french underdrain has been installed between the irrigation area and the creek to collect seepage. Collected seepage is combined with lagoon effluent prior to chlorination in the treatment system.

Only during the past year has the city been able to reliably measure and report discharge flow data. Recent average monthly discharge flows (12/99-3/00) ranged from 0.3 to 1.46 mgd. The NDPES permit application reports a maximum daily flow rate for the past year of 1.60 mgd.

(B) Endangered/Threatened Species List: Based on the above information EPA developed the following list.

Bull Trout, Snake River Fall Chinook Salmon, Snake River Steelhead, Bald Eagle, Grey Wolf, Canada Lynx, Ute Ladies' Tresses, MacFarlane's Four-o'clock, Spaldings Catchfly, Water Howellia

There were no proposed or candidate species listed for any of the facilities.

III. Preliminary Determination

EPA has determined that the issuance of the proposed permits for the Cities of Cottonwood and Weippe and Joint School District #171 (Timberline High School) will have no affect on any of the listed species applicable to each of the facilities. The natural barriers on both Jim Ford Creek and Cottonwood Creek preclude the salmonids from reaching the area of the permitted discharges. In addition, the draft permits do not allow discharges during extreme low flow conditions in order to assure compliance with the state's water quality standards and to coincide with the TMDLs that have been completed for these streams.

IV. Possible Effects of the Permits on Endangered/Threatened Species

(A) Salmonid Species: Similar factors affect all of the salmonid species in the area of the three referenced discharges. They include widespread habitat blockage from hydrosystem management and potentially deleterious genetic effects from straying and introgression from hatchery fish. Other identified threats include forestry, agriculture, mining, and urbanization that have degraded, simplified, and fragmented habitat. The already existing barriers to fish movements and anadromous fish migration, and the instream physical habitat limitations, preclude salmonid occurrence in the vicinity of the discharges. This is evidenced by existing fisheries data for each creek, which show salmonids only below the barriers which are approximately 10 miles below the Cottonwood discharge, 2 miles below the Weippe discharge, and 8 miles below the Timberline High School discharge. Issuance of the permits will have no impact on any of these issues; therefore, EPA has determined that permit reissuance will have no affect on any of the listed salmonid species.

(B) Bald Eagle: The primary reasons for the decline of the bald eagle are destruction of their habitat and food sources and widespread historic application of DDT. The proposed permits will have no impact on any of these issues. Therefore, EPA has determined that the

issuance of the three NPDES permits for the above facilities will have no affect on bald eagles.

(C) **Gray Wolf:** Hunting and habitat destruction are the primary causes of the species decline. Issuance of the NPDES permits for the above three facilities will not result in habitat destruction, nor will it result in changes in population that could result in increased habitat destruction. Issuance of the permits will not impact the food sources of the gray wolf. Therefore, EPA has determined that the reissuance of the permits for the above facilities will have no affect on gray wolves.

(D) **Canada Lynx:** The primary reasons for the decline of the lynx is over trapping. Several management options have been recommended to prevent over trapping including prohibiting exploitation in hare refugia, a combination of tree harvest suspensions in the more accessible trapping areas during low hare years, and a quota system as lynx numbers increase. The proposed permits will have no impact on any of these issues. Therefore, EPA has determined that the reissuance of the three NPDES permits for the above facilities will have no affect on the Canada Lynx

(E) **Ute Ladies' Tresses, McFarlane's Four-o'clock, Spaldings Catchfly, and Water howellia:** The primary reasons for the decline of these plant species are habitat loss or modification through development, stream channelization, water diversions, vehicular travel, surface disturbance associated with mining or agriculture, removal of trees near waterways, increased siltation due to logging, road building, and livestock grazing are all examples of activities that may impact these species. None of the threats to the plant species are associated with the three wastewater treatment facilities or reissuance of their permits. EPA has determined that the reissuance of the NPDES permits will have no affect on the listed plant species.

APPENDIX F
IDEQ Preliminary Comments on the Draft Permit

By letter, dated April 26, 2001, IDEQ submitted comments on the draft NPDES permit for the City of Cottonwood. The following are the relevant comments submitted:

E. coli and fecal coliform limits are satisfactory as proposed. Monitoring for fecal coliform needs to be 5/week to be consistent with Idaho regulations.

The permit needs a reopener clause for phosphorus.

Bull Trout temperature criteria are not applicable for Cottonwood Creek.

The permit needs to include monitoring for ammonia and a time table for the establishment of water quality-based effluent limits for ammonia. The reopener clause should be included to provide for future limits on ammonia once sufficient data are collected.

The calculations for chlorine in the draft permit need to be revised to reflect actual stream conditions. The initial calculations were done assuming a 50:1 dilution allowance which is incorrect.

There are subtle differences in monitoring requirements among the three permits. For example, Weippe has to do 8-hour composite sampling for BOD, TSS, and TP, whereas the others do not. Weippe does a 5 per month grab for fecal, the others do a once a week grab for fecal. Cottonwood samples BOD and TSS once a week, Weippe once a month, and Timberline twice a month. And there may be other sampling differences, all of which are not clear to us why they are different. We suggest that all permits have consistent sampling requirements whenever possible.